

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

- 1           1. (Currently amended) A method for dynamically adjusting the  
2   aggressiveness of an execute-ahead processor, comprising:  
3           executing instructions in an execute-ahead mode, wherein instructions that  
4   cannot be executed because of an unresolved data dependency are deferred in a  
5   deferred buffer, and other non-deferred instructions are executed in program  
6   order, and wherein if a non-data-dependent stall condition is encountered, the  
7   execute-ahead processor enters a scout mode, wherein instructions are  
8   speculatively executed to prefetch future loads, but results are not committed to  
9   the architectural state of the execute-ahead processor;  
10          executing deferred instructions in a deferred mode in response to  
11   determining if that an unresolved data dependency ~~is~~ was resolved during the  
12   execute-ahead mode;  
13          ~~executing deferred instructions in a deferred mode;~~  
14          ~~wherein if some instructions are deferred again during the deferred mode,~~  
15   ~~the method further comprises,~~  
16          waiting for the deferred buffer to empty in response to determining  
17   ~~whether that~~ an amount of work accomplished during the execute-ahead mode  
18   exceeds a predetermined threshold; and,  
19          if so,  
20          ~~waiting for the deferred buffer to empty, and~~  
21          returning to a normal execution mode;

22           ~~otherwise resuming execution in execute-ahead mode.~~

1           2. (Canceled).

1           3. (Currently amended) The method of claim 1, further comprising  
2 ~~wherein resuming execution in the non-aggressive mode involves resuming~~  
3 ~~execution-executing instructions~~ in a non-aggressive execute-ahead mode,  
4 wherein if a non-data-dependent stall condition is encountered, the execute-ahead  
5 processor does not enter the scout mode, but instead waits for the non-data-  
6 dependent stall condition to be resolved, or for an unresolved data dependency to  
7 return, before proceeding.

1           4. (Currently amended) The method of claim 1, wherein prior to executing  
2 instructions in the execute-ahead mode, the method further comprises entering the  
3 execute-ahead mode by:

4           issuing instructions for execution in program order during ~~[[a-]]~~ the normal  
5 execution mode;

6           upon encountering ~~an~~ a first unresolved data dependency during execution  
7 of an instruction,

8                           generating a checkpoint that can subsequently be used to

9                           return execution to the point of the instruction, and

10                          executing subsequent instructions in the execute-ahead

11                          mode.

1           5. (Currently amended) The method of claim 4, wherein if the first  
2 unresolved data dependency is finally resolved, the method further comprises  
3 using the checkpoint to resume execution in the normal execution mode, ~~from the~~

4 ~~launch point instruction (the instruction that originally encountered the launch~~  
5 ~~point stall condition).~~

1           6. (Original) The method of claim 1, wherein executing deferred  
2 instructions in the deferred mode involves:  
3           issuing deferred instructions for execution in program order;  
4           deferring execution of deferred instructions that still cannot be executed  
5 because of unresolved data dependencies; and  
6           executing other deferred instructions that are able to be executed in  
7 program order.

1           7. (Currently amended) The method of claim 6, wherein if all deferred  
2 instructions are executed in the deferred mode, the method further comprises  
3 returning to ~~[[a-]]~~ the normal execution mode to resume normal program  
4 execution from the point where the execute-ahead mode left off.

1           8. (Currently amended) The method of claim 1, wherein the unresolved  
2 data dependency ~~can include~~ is one of:  
3           a use of an operand that has not returned from a preceding load miss;  
4           a use of an operand that has not returned from a preceding translation  
5 lookaside buffer (TLB) miss;  
6           a use of an operand that has not returned from a preceding full or partial  
7 read-after-write (RAW) from store buffer operation; and  
8           a use of an operand that depends on another operand that is subject to an  
9 unresolved data dependency.

1           9. (Currently amended) The method of claim 1, wherein the non-data-  
2 dependent stall condition ~~can include~~ is one of:

3 a memory barrier operation;  
4 a load buffer full condition; and  
5 a store buffer full condition.

1 10. (Currently amended) An apparatus that dynamically adjusts the  
2 aggressiveness of an execute-ahead processor, comprising:  
3 an execution mechanism configured to:  
4 execute instructions in an execute-ahead mode, wherein  
5 instructions that cannot be executed because of an unresolved data  
6 dependency are deferred in a deferred buffer, and other non-  
7 deferred instructions are executed in program order, and wherein if  
8 a non-data-dependent stall condition is encountered, the execution  
9 mechanism is configured to enter a scout mode, wherein  
10 instructions are speculatively executed to prefetch future loads, but  
11 results are not committed to the architectural state of the execute-  
12 ahead processor;  
13 execute deferred instructions in a deferred mode in  
14 response to determining wherein if that an unresolved data  
15 dependency is was resolved during the execute-ahead mode; the  
16 ~~execution mechanism is configured to execute deferred instructions~~  
17 ~~in a deferred mode;~~  
18 wait for the deferred buffer to empty in response to  
19 determining that an amount of work accomplished during the  
20 execute-ahead mode exceeds a predetermined threshold; and to  
21 return to a normal execution mode.  
22 ~~wherein if some instructions are deferred again during the deferred mode,~~  
23 ~~the execution mechanism is configured to,~~

24                           ~~determine whether an amount of work accomplished during~~  
25                           ~~execute-ahead mode exceeds a predetermined threshold,~~  
26                           ~~if so,~~  
27                                           ~~waiting for the deferred buffer to empty, and~~  
28                                           ~~returning to normal execution mode,~~  
29                           ~~otherwise to resume execution in execute-ahead mode.~~

1           11. (Canceled).

1           12. (Currently amended) The apparatus of claim 10, wherein ~~while~~  
2   ~~resuming execution in the non-aggressive execution mode,~~ the execution  
3   mechanism is configured to execute instructions ~~resume execution~~ in a non-  
4   aggressive execute-ahead mode, wherein if a non-data-dependent stall condition is  
5   encountered, the execution mechanism does not enter the scout mode, but instead  
6   waits for the non-data-dependent stall condition to be resolved, or for an  
7   unresolved data dependency to return, before proceeding.

1           13. (Currently amended) The apparatus of claim 10, wherein prior to  
2   executing instructions in the execute-ahead mode, the execution mechanism is  
3   configured to enter the execute-ahead mode by:  
4           issuing instructions for execution in program order during ~~[[a-]]~~ the normal  
5   execution mode;  
6           upon encountering ~~an~~ a first unresolved data dependency during execution  
7   of an instruction,  
8                           generating a checkpoint that can subsequently be used to  
9                           return execution at to the point of the instruction, and  
10                          executing subsequent instructions in the execute-ahead  
11                          mode.

1           14. (Currently amended) The apparatus of claim 13, wherein if the first  
2    unresolved data dependency is finally resolved, the execution mechanism is  
3    configured to use the checkpoint to resume execution in the normal execution  
4    mode, ~~from the launch point instruction (the instruction that originally~~  
5    ~~encountered the launch point stall condition).~~

1           15. (Original) The apparatus of claim 10, wherein while executing  
2    deferred instructions in the deferred mode, the execution mechanism is configured  
3    to:  
4            issue deferred instructions for execution in program order;  
5            defer execution of deferred instructions that still cannot be executed  
6    because of unresolved data dependencies; and to  
7            execute other deferred instructions that are able to be executed in program  
8    order.

1           16. (Currently amended) The apparatus of claim 15, wherein if all deferred  
2    instructions are executed in the deferred mode, the execution mechanism is  
3    configured to return to ~~[[a-]]~~ the normal execution mode to resume normal  
4    program execution from the point where the execute-ahead mode left off.

1           17. (Currently amended) The apparatus of claim 10, wherein the  
2    unresolved data dependency ~~can include~~ is one of:  
3            a use of an operand that has not returned from a preceding load miss;  
4            a use of an operand that has not returned from a preceding translation  
5    lookaside buffer (TLB) miss;  
6            a use of an operand that has not returned from a preceding full or partial  
7    read-after-write (RAW) from store buffer operation; and

8 a use of an operand that depends on another operand that is subject to an  
9 unresolved data dependency.

1 18. (Currently amended) The apparatus of claim 10, wherein the non-data-  
2 dependent stall condition ~~can include~~ is one of:

3 a memory barrier operation;  
4 a load buffer full condition; and  
5 a store buffer full condition.

1 19. (Currently amended) A computer system that dynamically adjusts the  
2 aggressiveness of an execute-ahead processor, comprising:

3 an execute-ahead processor;  
4 a memory;  
5 an execution mechanism within the execute-ahead processor configured

6 to:

7 execute instructions in an execute-ahead mode, wherein  
8 instructions that cannot be executed because of an unresolved data  
9 dependency are deferred in a deferred buffer, and other non-  
10 deferred instructions are executed in program order, and wherein if  
11 a non-data-dependent stall condition is encountered, the execution  
12 mechanism is configured to enter a scout mode, wherein  
13 instructions are speculatively executed to prefetch future loads, but  
14 results are not committed to the architectural state of the execute-  
15 ahead processor;

16 execute deferred instructions in a deferred mode in  
17 response to determining wherein if that an unresolved data  
18 dependency ~~is~~ was resolved during the execute-ahead mode; ~~the~~

19                   ~~execution mechanism is configured to execute deferred instructions~~  
20                   ~~in a deferred mode;~~  
21                   ~~wait for the deferred buffer to empty in response to~~  
22                   ~~determining that an amount of work accomplished during the~~  
23                   ~~execute-ahead mode exceeds a predetermined threshold; and to~~  
24                   ~~return to a normal execution mode.~~  
25           ~~wherein if some instructions are deferred again during the deferred mode,~~  
26   ~~the execution mechanism is configured to,~~  
27                   ~~determine whether an amount of work accomplished during~~  
28                   ~~execute-ahead mode exceeds a predetermined threshold,~~  
29                   ~~if so,~~  
30                               ~~waiting for the deferred buffer to empty, and~~  
31                               ~~returning to normal execution mode,~~  
32                   ~~otherwise to resume execution in execute-ahead mode.~~

1           20. (Canceled).

1           21. (Currently amended) The computer system of claim 19, wherein ~~while~~  
2   ~~resuming execution in the non-aggressive execution mode,~~ the execution  
3   mechanism is configured to execute instructions ~~resume execution~~ in a non-  
4   aggressive execute-ahead mode, wherein if a non-data-dependent stall condition is  
5   encountered, the execution mechanism does not enter the scout mode, but instead  
6   waits for the non-data-dependent stall condition to be resolved, or for an  
7   unresolved data dependency to return, before proceeding.